

These discourses were given with the aim of interesting the senior students of the medical school in the all-important but very much neglected subject of the history of medicine. With this as their aim it is quite sure they succeeded and it is indeed gratifying that there is an ever-increasing number of publications dealing with the past of this noble profession of medicine. The book is most readable and is well illustrated with forty-eight half tones, portraits of some of the masters of medicine. It could hardly fail to awaken the student unless he were entirely anesthetic to the subject.

Unfortunately Major Seelig did not go over his manuscript very carefully before publishing it, else he had not allowed so many errors to remain. The dates of the founding of the various universities are not in accord with the best authorities and the school of Salerno is referred to as a university. John Locke is placed in with the lights of the eighteenth century, when his dates are 1632-1704. Glibly he speaks of a group of English surgeons of the early nineteenth century as being familiar to American surgeons and almost of yesteryear. It would be interesting to know how many American surgeons could tell what Aston Key, Benjamin Travers, William Ferguson and James Wardrop did. They might make out better with the remainder of those mentioned—Astley Cooper, John Bell, James Syme, Robert Liston and Benjamin Brodie.

As we remarked before, the aim of the lectures is to be commended and those who listened to them of course caught the inspiration which was what was intended, but before being put into cold type they should have had careful revision.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE PRODUCTION OF PURE ABSOLUTE ALCOHOL WITH CALCIUM CARBIDE AND ANHYDROUS COPPER SULPHATE

EACH of the best known of the various processes, as described in the literature¹⁻⁸ for producing absolute

¹ Mendeleeff, *Ann. Phys. Chem.* 1869, ii, 138, 230.

² Yvon, *Compt. rend.* 1897, 125, 1881-2. Ostermayer, *C. Bl.* 1898, I. 658. *Pharm. Ztg.* 43, 99 9/2.

³ Kailan, *Monatsch.* 1907, 28, 927.

⁴ Winkler, *Ber.* 1905, 38, 3612-16.

⁵ Plucker, *Zeit. Nahr u. Genussm.* 1919, 17, 454-8.

⁶ Pozzi, *Escat. Bull. Assoc. Chim. Sucr. Dict.* 1909, 26, 580.

⁷ Chavanne, *Bull. Soc. Chim. Belg.* 1813, 27, 205.

⁸ Young, *Trans. Chem. Soc.* 1902, 81, 707 and 717.

alcohol on a laboratory scale from 94 to 95 per cent. alcohol presents one or more disadvantages, namely, expense of materials, time consumed, low yield or poor quality of product.

The use of calcium carbide as an alcohol dehydrating agent was proposed by Yvon.² Approximately the first third of the distillate obtained under the conditions given contained acetylene. Ostermayer² reports the successful production of absolute alcohol by the Yvon procedure, but emphasizes the difficult removal of the bad odor and taste of the distillate, due to organic sulphur compounds. These objectionable characteristics of the 100 per cent. alcohol so obtained have discouraged or prevented the use of calcium carbide as an alcohol dehydrating agent.

The authors have made an experimental study of the operation for the purpose of increasing the yield of 100 per cent. alcohol, reducing both the time and the quantity of carbide, and finding satisfactory means of removing the acetylene, organic sulphur and phosphorus compounds which are retained by alcohol when treated as Yvon directs.

The data from the following experiment will indicate the procedure and the conditions found most satisfactory:

Experiment III: To 100 gr. (92.34 wt. per cent., 95.02 vol. per cent., alcohol, contained in a flask attached to a reflux condenser, were added 17.5 gr. of granular, -20 mesh, calcium carbide (81.1 per cent. pure CaC_2). The alcohol was maintained at boiling temperature on a water bath for thirty minutes, then 0.5-1.0 gr. of anhydrous copper sulphate was added, to engage the dissolved acetylene and sulphur compounds. Boiling under the reflux condenser was continued for fifteen minutes and the alcohol then distilled off.

Total distillate = 93.74 gr. or 98.66 per cent. of the theoretical yield. The specific gravity at 15 degrees C. = .7945 or 99.86 vol. per cent. alcohol, of normal odor and taste, and negative to tests for acetylene with Cu_2Cl_2 , sulphur compounds, aldehyde and free acid.

Qualitative tests for water in the alcoholic distillates were made with anhydrous copper sulphate, crystalline potassium permanganate and calcium carbide to determine the comparative delicacy of the reagents.

Anhydrous CuSO_4 is not nearly so delicate nor is a positive reaction as quickly obtained with it as with either of the other two. Potassium permanganate crystals showed faint pink after five minutes in 99.57 per cent alcohol—no color in 99.63 alcohol.

Powdered calcium carbide in 99.63 alcohol yielded visible gas bubbles⁹ after a few seconds, while KmnO_4 crystals showed no color after five minutes.

SUMMARY

(1) The above is recommended as an economical, convenient and quick method for producing absolute alcohol on a laboratory scale.

If the distillation is executed with free flame, excessive or careless heating must be avoided near the end of the operation because of the copper acetylide in the residue.

(2) Calcium carbide is recommended over potassium permanganate or anhydrous copper sulphate as a qualitative reagent in detecting traces of water in alcohol.

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SPECIAL ARTICLES

MANOILOV'S REACTION FOR IDENTIFICATION OF THE SEXES¹

IN a recent number of the *Russian Bulletin for Applied Botany and Plantbreeding* two papers² were published dealing with a problem which may have a great influence on the further development of studies on the physiology of sex. Since these papers deal with a subject in which many biologists are interested and since they are published in a periodical and language not very accessible to most of them it seems to us justifiable to give a short review of those papers and at the same time to present our tests of Dr. Manoïlov's method.

Dr. Manoïlov found a reaction³ by which it is pos-

⁹ The calcium carbide used in a qualitative test should be freed from occluded air, as this, when alcohol is added, will give air bubbles which may be mistaken for acetylene gas bubbles. The discharge of occluded air will cease within a few seconds; the generation of acetylene, if water is present, will continue for a time.

¹ Research carried on with the aid of a grant from the committee for research in problems of sex of the National Research Council.

² Manoïlov, E. O., "Identification of the sexes in dioecious plants by chemical reaction." *Bul. Appl. Bot. and Plantbreed.* 13(2): 503-505. 1922-1923.

Grünberg, O., An addition to the paper of Dr. Manoïlov: "Identification of the sexes in dioecious plants by chemical reaction." *Bul. Appl. Bot. and Plantbreed.* 13(2): 506. 1922-1923 (Both in Russian).

³ Manoïlov's paper describing the method which he used in experiments with animals was published in *Vratshebnaja Gazeta (Medical Gazette)* No. 15, 1923. Unfortunately, it has not been possible for us as yet to obtain this paper.

sible to distinguish female blood from male. The following reagents were used:

- (1) 1 per cent. solution of Papayotin in water.
- (2) 1 per cent. solution of Dahlia or Grüber's methyl-green in alcohol.
- (3) 1 per cent. solution of potassium permanganate in water.
- (4) 40 per cent. solution of HCl.
- (5) 2 per cent. solution of thiosinamin in water.

To 3 cc of 10 to 20 per cent. blood 10 drops of the first solution were added, after one or two minutes 3 drops of the second solution, then 10 drops of the third, 1 to 3 drops of the fourth and 5 drops of the fifth solution were added. After additions of the first, second and third solutions the material has to be stirred (not shaken), and after the addition of the fourth and fifth reagents it has to be shaken. The male blood soon becomes colorless or nearly so, while female blood retains its reddish-violet color.

Dr. Manoïlov is inclined to believe that hemoglobin is responsible for the differential male and female reactions he obtained, and since chlorophyll is chemically closely related to hemoglobin he tried to see if the same reaction would occur in dioecious plants. An alcoholic extract of chlorophyll from leaves was made by letting 10g of leaves stand for two hours in 30 cc of 60 per cent. alcohol. To 3 cc of that extract the same reagents were added in the way described above. Positive results were obtained, *e.g.*, solutions from male plants became colorless and those from female plants retained the color. Experiments were made with *Acer negundo*, *Lychnis dioica*, *Vallisneria*, *Urtica* and *Cannabis*, all giving the same results.

Grünberg tested Manoïlov's method on the following plants: *Vallisneria* sp., *Urtica dioica*, *Cannabis sativa*, *Populus* sp., *Hippophae rhamnoides*, *Eucephalartos villosus*, *E. longifolius* and *Begonia* sp. Especially interesting results were obtained with monoecious *Begonia*: male flowers gave the characteristic male reactions, female flowers gave the female reaction and the leaves an intermediate one. The experiments of Grünberg showed that the presence of chlorophyll is not essential for the reaction to occur. This was confirmed by the results of investigations conducted by Minenkov⁴ who obtained differential sexual reaction using seed and young seedlings of dioecious plants. Minenkov's method, however, was entirely different from that used by Manoïlov.

Experiments to test Manoïlov's method are being made by the authors, and positive results have been obtained with the following organisms:

⁴ Minenkov, A., *Nautschno Agronomitscheskii Zhurnal (Jour. Sci. Agr.)*, Vol. 1, 1924.